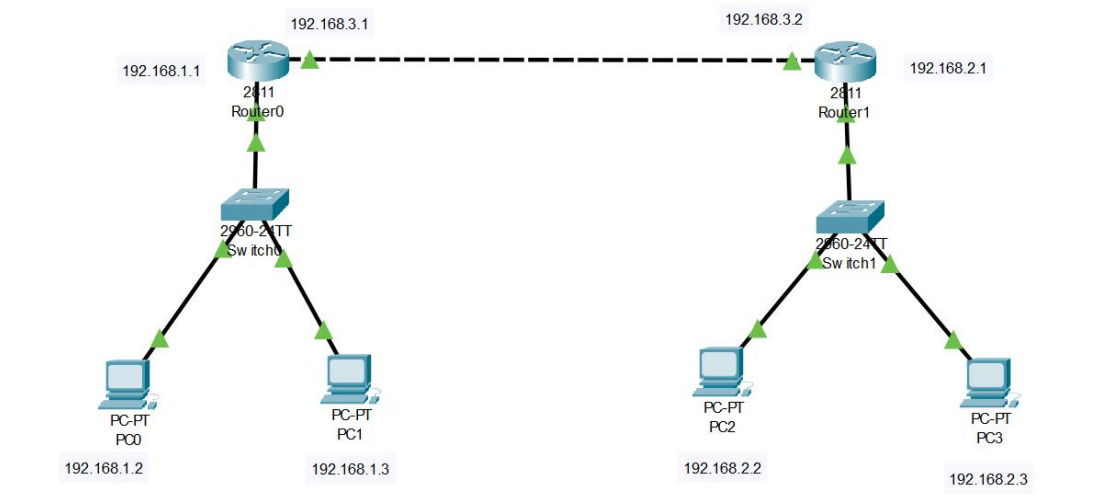# DCN 2 - LAB DOCUMENTATION

Course：DCN - 2 (LAB)

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Submitted to：Ms Attiya

Static Routing

Network Overview:

This lab demonstrates a basic network setup with two separate networks connected by two routers.

Devices and Roles:

- **Router0 and Router1:** Act as the central hubs, connecting devices within each network.
- **Switch0 and Switch1:** Connect devices within their respective networks.
- **PCs (PC0, PC1, PC2, PC3):** Represent user devices within the network.

Network Configuration:

1. **Routers:**

   - Configure IP addresses for each interface (e.g., 192.168.1.1, 192.168.2.1, 192.168.3.1, 192.168.3.2).
   - Enable routing protocols (e.g., RIP, OSPF) to establish communication between the two networks.
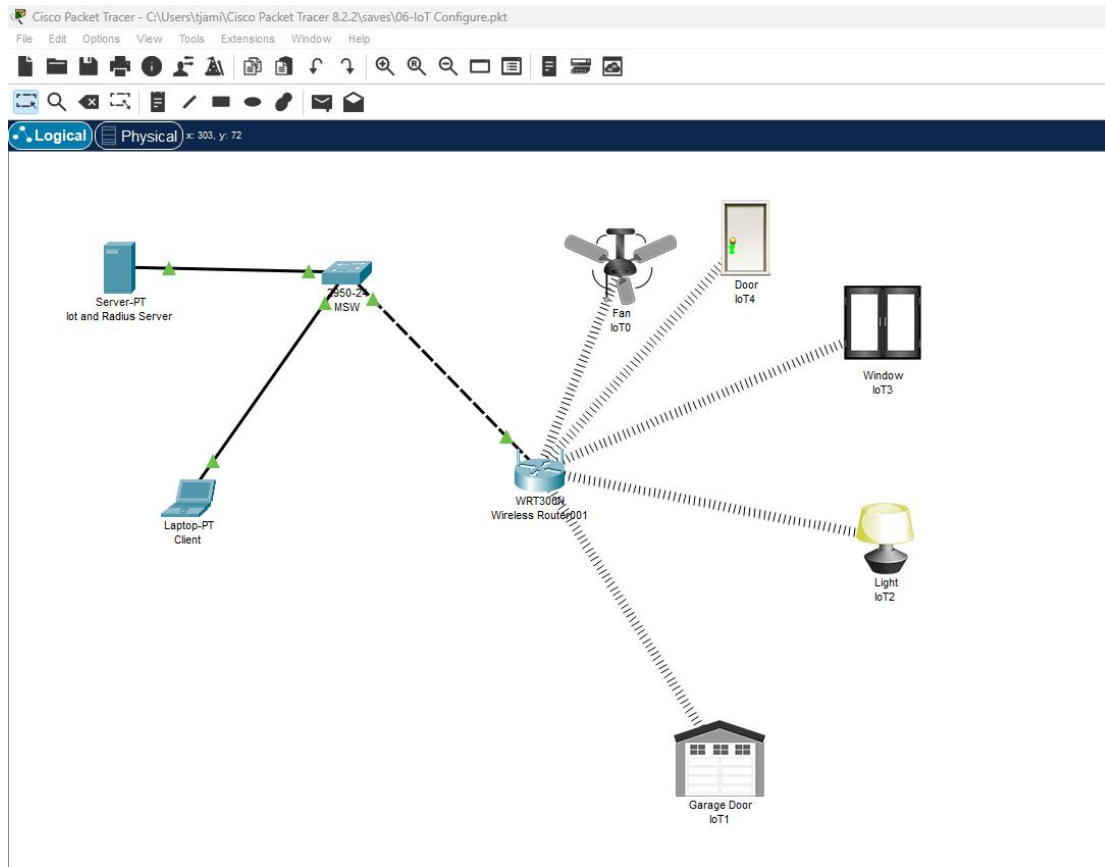
2. **Switches:**

   - Configure VLANs (if applicable) to segment the network into different broadcast domains.

3. **PCs:**

   - Assign IP addresses to each PC within their respective networks.

IOT Config

Network Overview:

This lab demonstrates a basic IoT network setup, connecting various devices to a central wireless router for remote control and monitoring.

Devices and Roles:

- **Server-PT:** Hosts the IoT and RADIUS server, responsible for authentication and authorization of IoT devices.
- **MSW:** A switch connecting the server to the wireless router.
- **WRT308N (Wireless Router):** Acts as the central hub, connecting all IoT devices wirelessly.
- **Laptop-PT:** Represents a user's device for controlling and monitoring IoT devices.
- **IoT Devices:**
  - **Door:** Controls the opening and closing of a door.
  - **Fan:** Controls the speed and direction of a fan.
  - **Window:** Controls the opening and closing of a window.
  - **Light:** Controls the intensity of a light.
  - **Garage Door:** Controls the opening and closing of a garage door.

Network Configuration:

1. **Server-PT:**

   o Configure the IoT and RADIUS server to authenticate and authorize IoT devices.

2. **MSW:**

   o Configure the switch to connect the server and wireless router.

3. **WRT308N (Wireless Router):**

   o Configure the router's SSID and security settings.
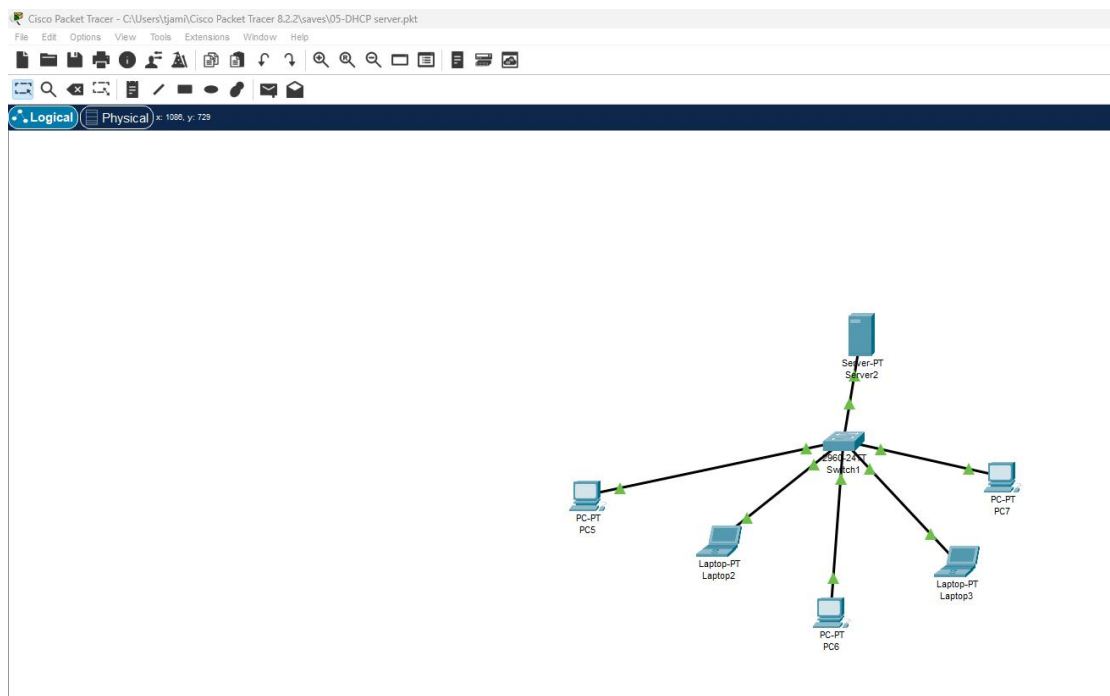   o Assign IP addresses to IoT devices using DHCP or static IP addresses.

4. **IoT Devices:**

   o Configure each device with its IP address and necessary credentials for communication with the server.

5. **Laptop-PT:**

   o Connect to the wireless network and install the necessary software for controlling and monitoring IoT devices.

DHCP Config

Network Overview:

This lab demonstrates a basic network setup with a DHCP server providing IP addresses to client devices.

Devices and Roles:

- **Server2:** Acts as the DHCP server, assigning IP addresses to client devices.
- **Switch1:** Connects all devices within the network.
- **PCs (PC5, PC6, PC7):** Represent client devices that will obtain IP addresses from the DHCP server.
- **Laptops (Laptop2, Laptop3):** Represent client devices that will obtain IP addresses from the DHCP server.

Network Configuration:

1. **Server2:**

   - Configure the DHCP server to assign IP addresses to clients within a specific IP range.
   - Set up the DHCP scope to define the available IP addresses, subnet mask, default gateway, and DNS server addresses.
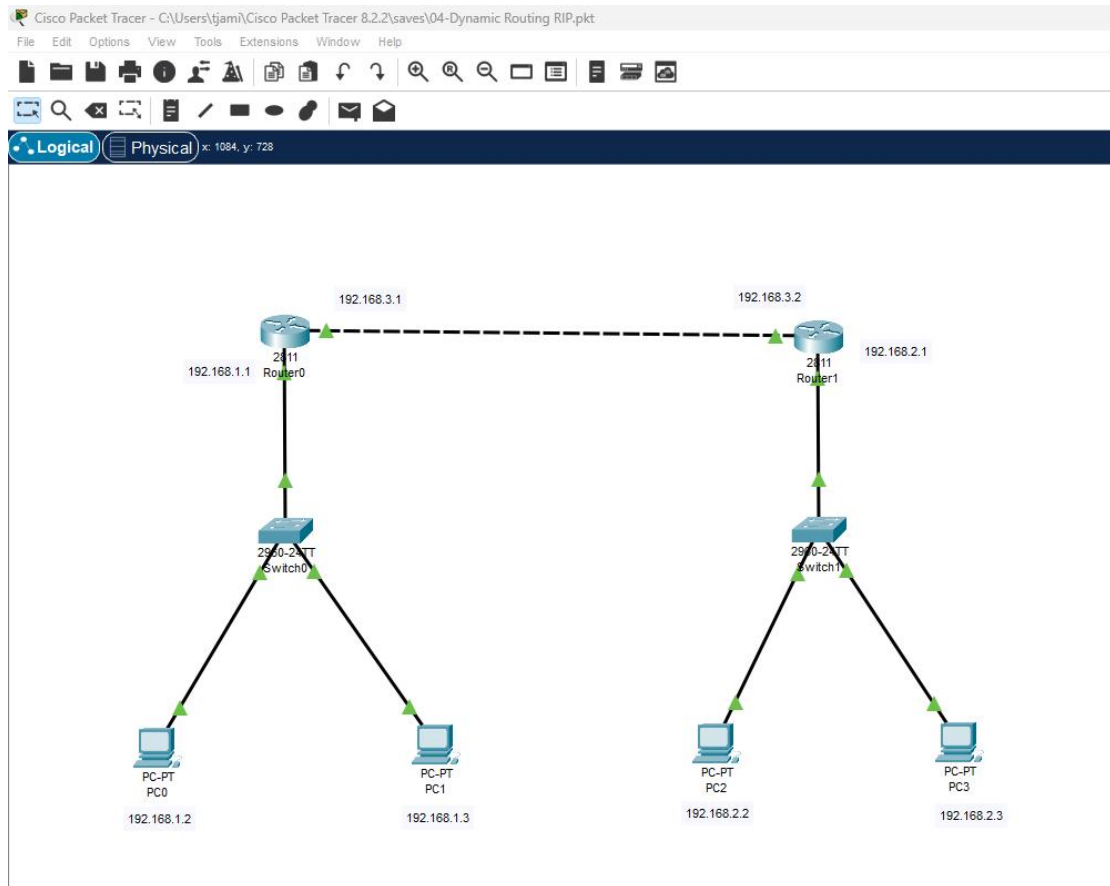
2. **Switch1:**

   - Configure VLANs (if applicable) to segment the network into different broadcast domains.

3. **PCs and Laptops:**

   - Configure the network interface cards (NICs) of the client devices to obtain IP addresses automatically via DHCP.

RIP DYNAMIC ROUTING

Network Overview:

This lab demonstrates a basic network setup with two separate networks connected by two routers using the Routing Information Protocol (RIP) for dynamic routing.

Devices and Roles:

- **Router0 and Router1:** Act as the central hubs, connecting devices within each network and exchanging routing information using RIP.
- **Switch0 and Switch1:** Connect devices within their respective networks.
- **PCs (PC0, PC1, PC2, PC3):** Represent user devices within the network.

Network Configuration:

1. **Routers:**

   o Configure IP addresses for each interface (e.g., 192.168.1.1, 192.168.2.1, 192.168.3.1, 192.168.3.2).
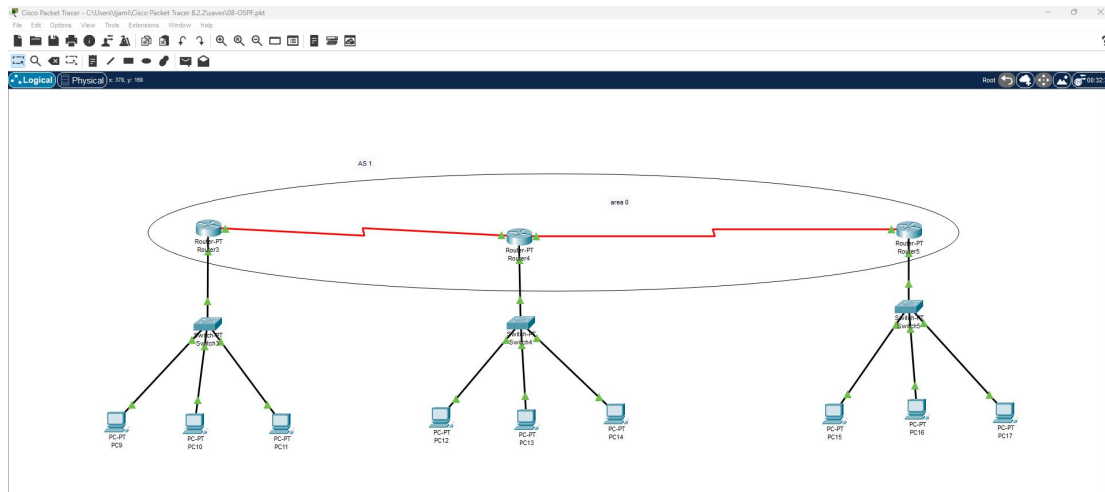   o Enable RIP to exchange routing information with the neighboring router.

2. **Switches:**

   o Configure VLANs (if applicable) to segment the network into different broadcast domains.

3. **PCs:**

   o   Assign IP addresses to each PC within their respective networks.

OSPF Config

Network Overview:

This lab demonstrates a basic network setup with three routers connected using the Open Shortest Path First (OSPF) protocol for dynamic routing.

Devices and Roles:

- **R1, R2, and R3:** Routers configured with OSPF to exchange routing information and determine the shortest paths between networks.
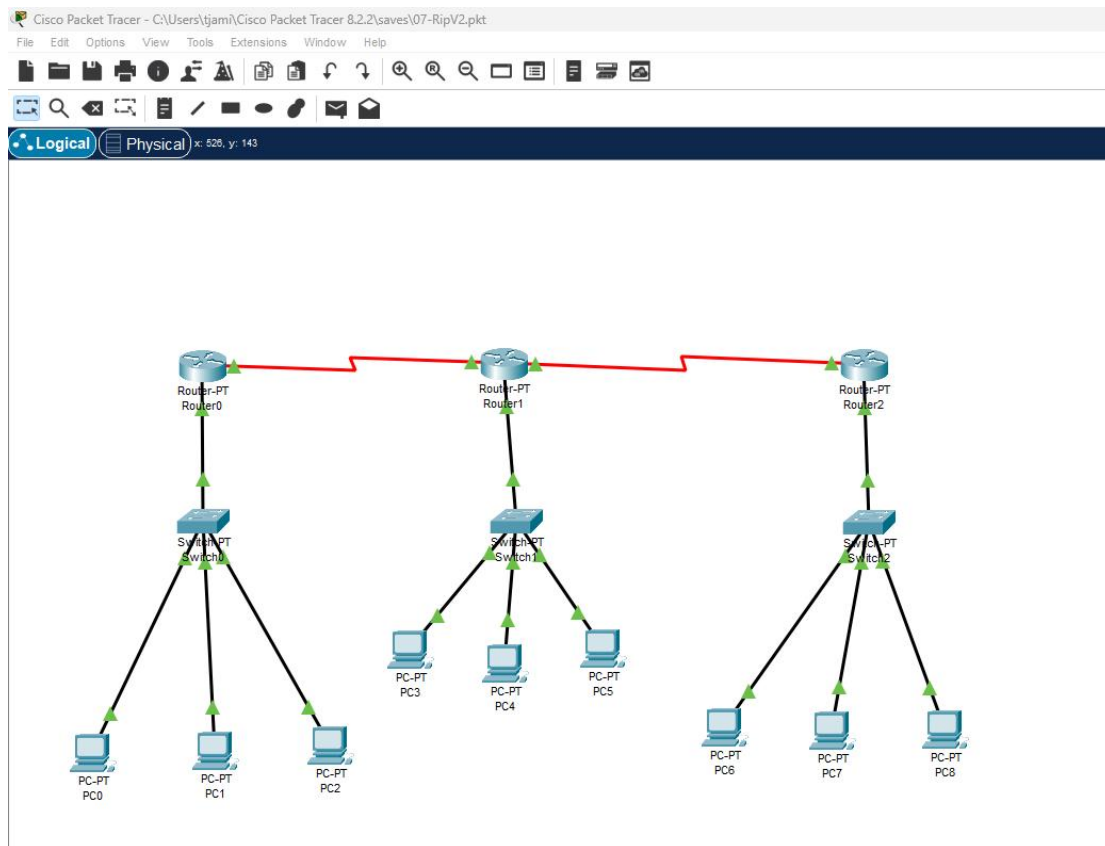- **PCs:** End devices connected to the routers.

Network Configuration:

1. **Routers:**

   o   Configure IP addresses for each interface.
   o   Enable OSPF and configure the OSPF process ID and network statements to define the OSPF areas.
   o   Optionally, configure OSPF authentication to secure the routing protocol.

2. **PCs:**

   o   Assign IP addresses to each PC within their respective networks.

RIP V2

Network Overview:

This lab demonstrates a basic network setup with three routers connected using the Routing Information Protocol version 2 (RIPv2) for dynamic routing.

Devices and Roles:

- **Router0, Router1, and Router2:** Routers configured with RIPv2 to exchange routing information and determine the shortest paths between networks.
- **Switches:** Connect devices within their respective networks.
- **PCs:** End devices connected to the routers.

Network Configuration:

1. **Routers:**

   o Configure IP addresses for each interface.
   o Enable RIPv2 and configure the network statements to define the networks that the router is advertising.
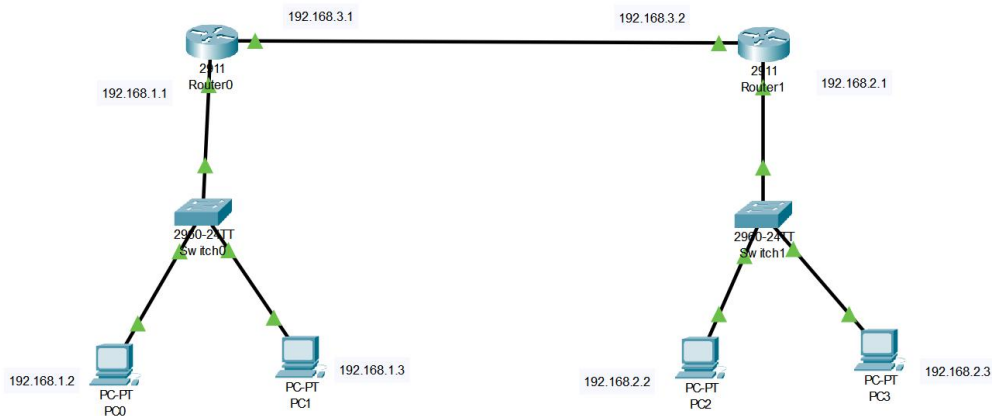   o Optionally, configure RIPv2 authentication to secure the routing protocol.

2. **Switches:**

- o Configure VLANs (if applicable) to segment the network into different broadcast domains.

3. **PCs:**

   - o Assign IP addresses to each PC within their respective networks.

DYNAMIC ROUTING

Network Overview:

This lab demonstrates a basic network setup with two separate networks connected by two routers using a dynamic routing protocol.

Devices and Roles:

- **Router0 and Router1:** Act as the central hubs, connecting devices within each network and exchanging routing information using a dynamic routing protocol.
- **Switch0 and Switch1:** Connect devices within their respective networks.
- **PCs (PC0, PC1, PC2, PC3):** Represent user devices within the network.

Network Configuration:

1. **Routers:**

   - o Configure IP addresses for each interface (e.g., 192.168.1.1, 192.168.2.1, 192.168.3.1, 192.168.3.2).
   - o Enable a dynamic routing protocol (e.g., RIP, OSPF, EIGRP) to exchange routing information with the neighboring router.
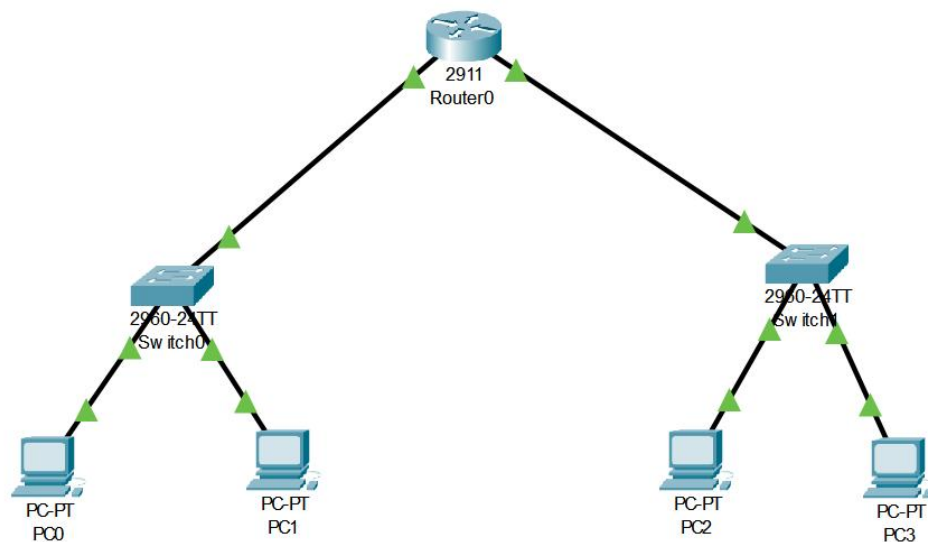
2. **Switches:**

   o   Configure VLANs (if applicable) to segment the network into different broadcast domains.

3. **PCs:**

   o   Assign IP addresses to each PC within their respective networks.

SUBNETTING

Network Overview:

This lab demonstrates a basic network setup with two subnets connected by a single router.

Devices and Roles:

- **Router0:** Acts as the central hub, connecting devices within both subnets.
- **Switch0 and Switch1:** Connect devices within their respective subnets.
- **PCs:** End devices connected to the switches.

Network Configuration:

1. **Router0:**

o   Configure IP addresses for each interface (e.g., 192.168.1.1/24, 192.168.2.1/24).
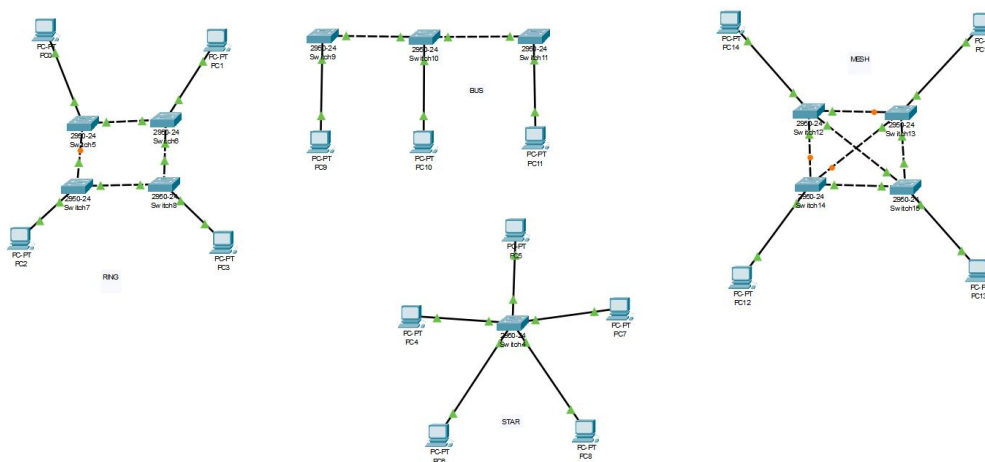
2. **Switches:**

   o   Configure VLANs to segment the network into different broadcast domains.

3. **PCs:**

   o   Assign IP addresses to each PC within their respective subnets.

TOPOLOGIES

Network Overview:

This lab demonstrates various network topologies: Bus, Ring, Star, Mesh, and Hybrid.
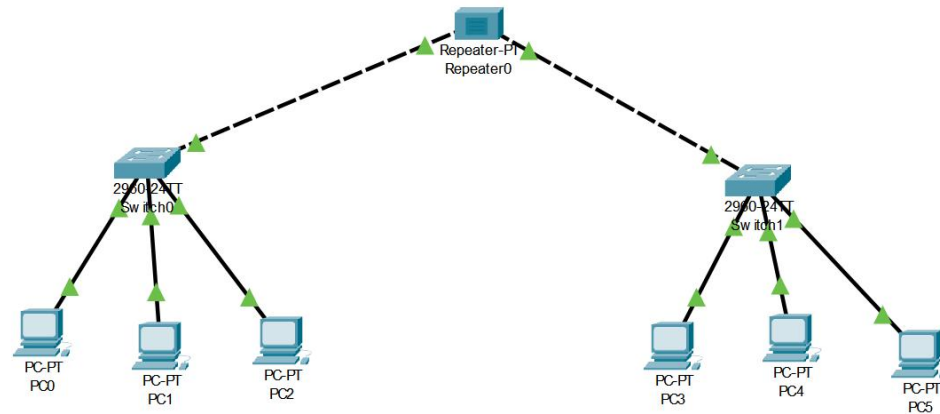
Devices and Roles:

- **Switches and Hubs:** Connect devices within their respective topologies.
- **PCs:** End devices connected to the switches and hubs.

Network Configuration:

Note: The specific configuration will depend on the type of devices used and the desired network functionality. However, here are some general guidelines:

- **Switches:**

  o   Configure VLANs to segment the network into different broadcast domains.

- **PCs:**
  o   Assign IP addresses to each PC within their respective networks.

Lab-5

Network Overview:

This lab demonstrates a basic network setup with two separate networks connected by a repeater.

Devices and Roles:

- **Repeater0:** Extends the network signal to increase the distance of the network.
- **Switch0 and Switch1:** Connect devices within their respective networks.
- **PCs:** End devices connected to the switches.

Network Configuration:

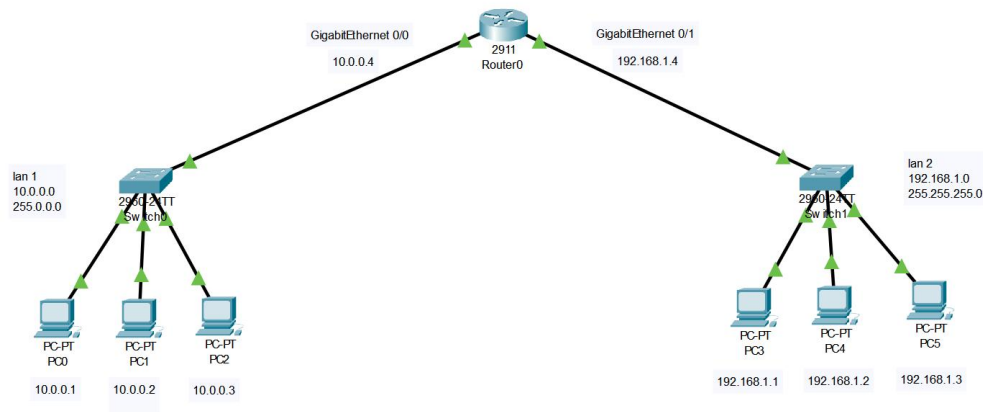**Note:** Repeaters do not require any configuration. They simply amplify and retransmit signals.

Switches:

- Configure VLANs (if applicable) to segment the network into different broadcast domains.

PCs:

- Assign IP addresses to each PC within their respective networks.

Lab-4

Network Overview:

This lab demonstrates a basic network setup with two separate networks connected by a single router.

Devices and Roles:

- **Router0:** Acts as the central hub, connecting devices within both networks.
- **Switch0 and Switch1:** Connect devices within their respective networks.
- **PCs:** End devices connected to the switches.

Network Configuration:

1. **Router0:**

   o Configure IP addresses for each interface (e.g., 10.0.0.4, 192.168.1.4).
   o Configure routing protocols (e.g., RIP, OSPF, EIGRP) to enable communication between the two networks.
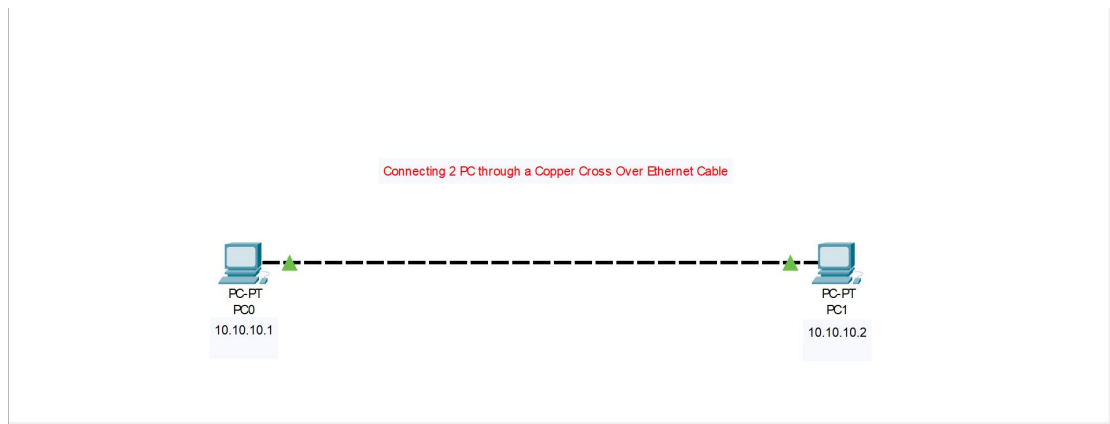
2. **Switches:**

   o Configure VLANs (if applicable) to segment the network into different broadcast domains.
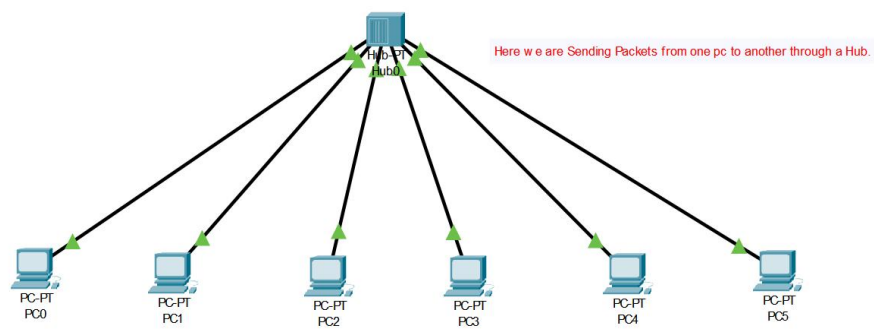
3. **PCs:**

   o Assign IP addresses to each PC within their respective networks.

Lab-1

Connecting 2 PC through a Copper Cross Over Ethernet Cable

PC-PT
PC0
10.10.10.1

PC-PT
PC1
10.10.10.2

Lab-2

Hub-PT
Hub0

Here w e are Sending Packets from one pc to another through a Hub.

PC-PT
PC0

PC-PT
PC1

PC-PT
PC2

PC-PT
PC3

PC-PT
PC4

PC-PT
PC5

Lab-3

2960-24TT
Sw itch0

Sending Packets from one pc to another using a Sw itch

PC-PT
PC0

PC-PT
PC1

PC-PT
PC2

PC-PT
PC3

PC-PT
PC4